Gross monthly earnings per employee

(Social Security and *Caixa Geral de Aposentações* – Data analysed by Statistics Portugal)

December 2019

Gross monthly earnings per employee increased by 2.4% in the 4th quarter of 2019 to €1,418.

The gross monthly earnings per employee (per job) increased by 2.4% in the 4th quarter of 2019, compared to the same period of 2018, and the regular monthly earnings increased by 2.5%, reaching €1,418 and €1,041, respectively. These data concern to nearly 4.2 million jobs, corresponding to the Social Security's beneficiaries and the subscribers of *Caixa Geral de Aposentações*. In real terms, taking into account the change of the Consumer Price Index during the period under analysis, the gross monthly earnings per employee increased by 2.1% and its regular component increased by 2.2%.

In 2019, the total gross earnings per employee increased by 2.7%, to €1,276, and the regular component increased by 2.6%, to €1,038. In real terms, those changes were 2.4% and 2.2%, respectively. In 2018, in nominal terms, the total gross earnings have changed by 2.1% and the regular component changed by 1.7%, while in real terms the changes were 1.1% and 0.7%, respectively.

1. Introduction

Following the work that Statistics Portugal has been doing with the statistical use of data from the Monthly Statement of Earnings (DMR – *Declaração Mensal de Remunerações*) sent by enterprises[1] to the Social Security and the Contributive Relation (RC – *Relação Contributiva*) of *Caixa Geral de Aposentações* (CGA)[2], that represents an universe of 4.2 million employees

(jobs), in this Press Release we publish the gross monthly earnings per employee, total and regular, by economic activity, up to the 4th quarter of 2019 (and the year of 2019[3]).

We also release, for the first time, the estimates by employment size class (eight classes) and for Small and Medium-size Enterprises and for Large-size Enterprises.

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[1] For simplification of language, we use the designation "enterprise", although, besides the data also includes other entities (foundations, institutes and other organisms, being public, private or from the social sector). Thus, the estimates by enterprises size class, refers to enterprises and other entities. In the future, we aim to explore, given the data limitations, the relation between the "enterprises" and the institutional sector (public and private). In this Press Release, we publish preliminary estimates for the years of 2018 and 2019 of the Public Administration using the National Accounts definition.

[2] CGA is the Portuguese public servants retirement and survivor pensions funds. Up to 2005, all employees in the public sector made their social contribution to CGA. Since the end of 2005, all new employees in the public sector were integrated in the general public Social Security, as an employee in the private sector.

[3] The estimates for the year of 2019 are provisional up to the release of the definitive estimates of the 4th quarter of 2019 in 7 May 2020.
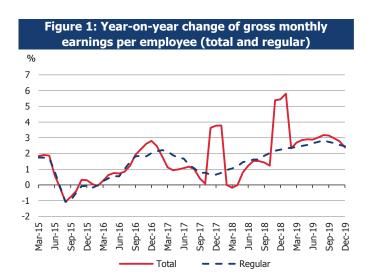
2. Gross monthly earnings per employee and its components

In December 2019 (quarter ended in December 2019)[4], the gross monthly earnings per employee stood at €1,418, a year-on-year increase of 2.4% (Figure 1), 0.7 percentage points (pp) less than in September 2019 (3.1%).
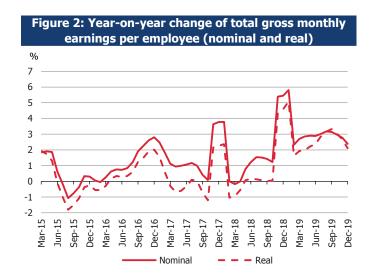
In 2019, the gross monthly earnings per employee increased by 2.7% compared to the same period of the year before. In 2018, compared to 2017, the increase had been 2.1%.

Figure 1: Year-on-year change of gross monthly earnings per employee (total and regular)

The regular gross monthly earnings per employee, which exclude, among other earnings components, the Christmas and Holidays allowances and, thus, have a less seasonal behaviour[5], showed a year-on-year increase of 2.5%, increasing from €1,015 in December

2018 to €1,041 in December 2019. This component has also registered a slight deceleration compared to September 2019 (less 0.2 pp), breaking the acceleration trend started in December 2017.

In 2019, the regular gross monthly earnings per employee increased by 2.6% compared to the year before (1.7% in 2018).

Figure 2: Year-on-year change of total gross monthly earnings per employee (nominal and real)
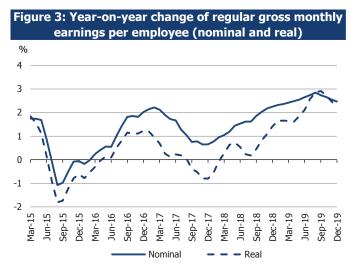
The significant fluctuations registered in the end of 2017 and 2018 were, as mention in the previous Press release, due to the changes in the payment of the Christmas allowances in the public sector (50% in November 2017; 100% in November 2018), whereas in the previous years they had been paid in one-twelfth over the year.

In real terms, that is, taking into account the inflation effect measured by the Consumer Price Index (CPI), the total earnings registered a year-on-year increase of 2.1% (Figure 2) and the regular earnings recorded a year-on-year increase of 2.2% (Figure 3).

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[4] The monthly data analysed in this Press Release refer to moving quarters ended in the reference month. Unless otherwise stated, the rates of change correspond to year-on-year ones (compared to the same moving quarter of the previous year). The year-on-year change series of the indicators under analysis are shown in the tables in the Annex.

[5] For a more detail description of the earnings components included in the total and in the regular gross monthly earnings, see the Technical note.

Figure 3: Year-on-year change of regular gross monthly earnings per employee (nominal and real)

In the year of 2019, the total gross monthly earnings per employee was €1,276, having increased by 2.7% in nominal terms and by 2.4% in real terms (it had increased by 2.1% and 1.1% in 2018). In the same period, the regular gross monthly earnings were €1,038, recording a nominal increase of 2.6% and a real one of 2.2% (1.7% and 0.7% in 2018).

3. Gross earnings by economic activity[6]

In December 2019, the total earnings varied between €860 in the *Agriculture, farming of animals, hunting and forestry* (section A), and €3,403 in the activities of *Electricity, gas, steam and air conditioning supply* (D) (Table 2a of the Annex).
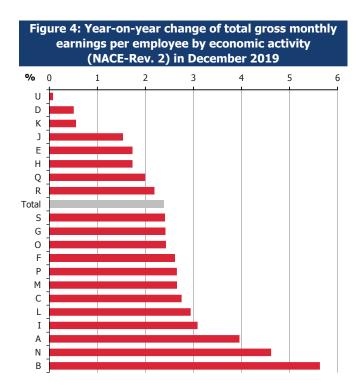
In turn, the regular earnings varied between €653 in the *Administrative and support service activities* (N), and €2,497 in the activities of *Electricity, gas, steam and air conditioning supply* (D).

Compared to the same period of 2018, the major change in total earnings was observed in activities of

Mining and quarrying (B; 5.6%), followed by the activities of *Administrative and support service activities* (N; 4.6%) (Figure 4).

On the other hand, the total earnings in *Activities of extraterritorial organisations and bodies* (U) remained almost unchanged (more 0.1%), the activities of *Electricity, gas, steam, cold and hot water and cold air* (D) recorded an increase of 0.5% and the *Financial and insurance activities* (K) increased by 0.6%.
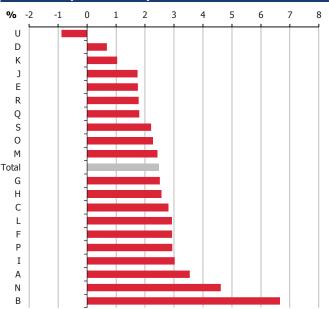
Figure 4: Year-on-year change of total gross monthly earnings per employee by economic activity (NACE-Rev. 2) in December 2019

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[6] The economic activity designations can be found in Table 2 of the Annex.

Figure 5: Year-on-year change of regular gross monthly earnings per employee by economic activity (NACE-Rev. 2) in December 2019

Gross earnings in Public Administration in 2019
Preliminary estimate

Using as reference the list of entities that belong to the Public Administration as used in the National Accounts, published in Statistics Portugal webpage, the total and regular gross earnings per employee (per job), in 2018 and 2019, were estimated as following:

	2018	2019	Change
	Euros		%
Total gross earnings	1,799	1,845	2.6
Regular gross earnings	1,493	1,526	2.2

These results show changes similar, although lower, to the changes estimated to the economy (2.7% and 2.6%, respectively).

The larger changes of the regular earnings were observed in the *Mining and quarrying* (B; 6.7%) and activities of *Administrative and support service activities* (N; 4.6%), while the smallest change was registered in the activities of *Activities of extraterritorial organisations and bodies* (U) with a decrease of 0.9% (Figure 5).

In 2019, the total gross earnings were higher in the activities of *Electricity, gas, steam, cold and hot water and cold air* (D; €3,032) and in the *Financial and insurance activities* (K; €2,507), having increased by 0.3% and 0.5%, respectively, compared to 2018. In turn, the lowest total gross earnings were recorded in the activities of *Agriculture, farming of animals, hunting and forestry* (A; €801) and in the activities of *Accommodation and food service activities* (I; €824) having, however, increased by 3.5% and 3.6%, respectively, compared to the year before.

4. Gross earnings by enterprise size

There is large empirical evidence that bigger enterprises pay higher wages, on average, to their employees, *ie*, there is a wage premium associated to the enterprise size. The link for this association is productivity, which is also higher, on average, in larger-size enterprises, the reason for which those enterprises can better remunerate their employees. The following theoretical foundations precede this evidence:

1. The employees of bigger enterprises have the opportunity to specialize in a limited number of tasks, becoming more efficient and productive in the execution of their tasks. This advantage can be translated into higher wages.

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2. In turn, bigger enterprises:

- Can use better the benefits of labour division, giving to each employee the tasks were they better perform;

- Have the ability to recruit the best workers by paying them higher wages;

- Tend to have more market power, to be more capital intensive and to have higher union rates, which, in general, are associated to higher wages;

- Benefit from paying higher wages ("efficiency-wages"), because it is more difficult to monitor the work of their employees, and therefore signal that they are paying above the market level.

Ideally, the estimation of the wage premium should be done by using longitudinal linked employer-employee datasets, with wage regressions that allow the control for the employee characteristics (education level, qualification, job experience, age, and occupation among others), the employer characteristics (economic activity, capital intensity and its origin, and market power, among others) and employee and employer fixed effects.
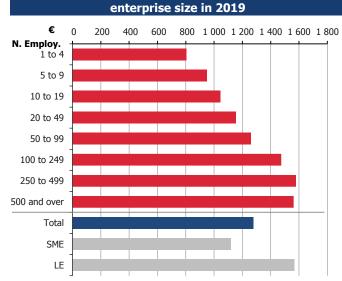
The information currently available in Statistics Portugal, only at the employer level, does not allow performing those estimations. However, it is still possible to estimate wage differentials (non-corrected for observed and unobserved characteristics of employers and employees) of size classes of enterprises compared to the economy total.

The total gross monthly earnings per employee increase nearly monotonically with the firm size (measured by the number of employees) and the difference between Small and Medium-size Enterprises (SME: up to 249 employees) and Large-size Enterprises (LE: 250 employees and more) varies with the economic activity.

In 2019, the total gross earnings varied between €804 in enterprises in the size class of 1 to 4 employees and €1,578 in enterprises with 250 to 499 employees (Figure 6). In bigger enterprises with 500 employees and over, however, the total gross earnings was slightly smaller, €1,562. The total gross earnings per employee in the employment size class of 50 to 99 employees (€1,257) were the closest to the economy total (€1,276).

For the SME, the total gross earnings (€1,116) were 12,5% below the economy total (€1,276), while for the LE the total gross earnings (€1,565) stood 22,7% above (Figure 7). This means that there is a positive wage differential for the employees of LE and a monetary disadvantage for SME employees.

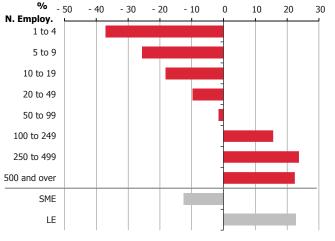Figure 6: Total gross earnings per employee by enterprise size in 2019

Notes:
SME: Small and Medium-size Enterprises (up o 249 employees).
LE: Large-size Enterprises (250 employees and over).

Figure 7: Wage differential by enterprise size in 2019

Notes:
SME: Small and Medium-size Enterprises (up o 249 employees).
LE: Large-size Enterprises (250 employees and over).

Figure 8: Total gross earnings per employee by enterprise size class

Notes:
SME: Small and Medium-size Enterprises (up o 249 employees).
LE: Large-size Enterprises (250 employees and over).

From 2014 to 2019, the total gross earnings increased, cumulatively, in SME (10.5%) and in LE (6.8%): from €1,011, in 2014, to €1,116, in 2019, for SME; from €1,465, in 2014, to €1,565, in 2019, for LE (Figure 8). For the economy total, the total gross earnings increased by 8.7% in the period under analysis (from €1,173 to €1,276).

In 2019, compared to the year before, the total gross earnings increased by 2.7%, an increase that occurred in both size classes of enterprises, although, and again, more favourably to SME (3.1%) than to LE (2.3%).

The wage differential associated to the LE is observed for almost all economic activities[7] (Figure 9).

In 2019, the economic activities that recorded the higher wage differentials associated to working in LE (compared to the average of the economic activity) were the *Arts, entertainment, sports and recreation activities* (R; 75.7%), *Other service activities* (S; 56.9%) and *Construction* (F; 52.7%).

In three more activities, the wage differentials were higher than in the total economy: *Transportation and storage* (H; 34.6%), *Human health and social work activities* (Q; 33.9%) and *Manufacturing* (C; 29.2%).

In seven activities, the wage differentials were lower than in the total economy, although positive. The *Public administration and defence; compulsory social security* (O) stands out with the second lowest (positive) wage differential (4.3%), despite being an activity that

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[7] In this analysis, section B, D and L were excluded due to statistical confidentiality reasons.

concentrates a substantial share of earnings volume and number of employees of the economy (11.4% and 8.8%, respectively) (see Figure of Technical Note).

Notes:
Industry: Sections B to E of NACE Rev. 2
Construction: Sections F of NACE Rev. 2
Services: Sections G to S of NACE Rev. 2

In turn, a negative wage differential of LE was observed in the *Administrative and support service activities* (N; -9.4%) and in the activities of *Wholesale and retail trade; repair of motor vehicles and motorcycles* (G; -2.0%). In the activities of *Water collection, treatment and distribution; sewerage, waste management and remediation activities* (E), the wage differential of LE was almost null (0.5%).

In general, the activities of the *Industry*[8] and the *Construction*[9] were the ones that recorded the higher gross wage differentials of working in LE (30.9% and

52.7%, respectively). In *Services,*[10] that wage differential was 17.4%, as documented in recent literature[11].

Also note that, in the period of analysis, the wage differential of LE has been decreasing, from 24.9%, in 2014, to 22.7%, in 2019, in contrast with the wage differential of SME, that has become less negative, from -13.8%, in 2014, to -12.5% in 2019.

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[8] Sections B to E of NACE Rev. 2.
[9] Section F of NACE Rev. 2.

[10] Section G to S of NACE Rev. 2.
[11] See, for exemple, Berlingieri, G, S Calligaris, and C Criscuolo (2018), "The Productivity-wage Premium: Does Size Still Matter in a Service Economy?", OECD Science, Technology and Industry Working Papers No. 2018/13.

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Portugal	Table 1: Number of employees and gross monthly earnings per employee (total and regular)					
	Quarter ended in the month			Year-on-year change		
	Number of employees	Total gross earnings	Regular gross earnings	Number of employees	Total gross earnings	Regular gross earnings
	Thousands	Euro		%		
2019						
December	4,205.2	1,418.0	1,041.0	3.1	2.4	2.5
November	4,212.0	1,341.0	1,038.0	3.3	2.8	2.5
October	4,201.3	1,171.0	1,039.0	3.4	3.0	2.7
September	4,203.1	1,222	1,038	3.5	3.1	2.7
August	4,197.2	1,359	1,038	3.5	3.2	2.8
July	4,187.6	1,350	1,038	3.6	3.0	2.7
June	4,158.7	1,305	1,038	3.7	2.9	2.7
May	4,124.0	1,171	1,040	3.7	2.9	2.5
April	4,091.8	1,155	1,039	3.7	2.9	2.5
March	4,066.3	1,153	1,036	3.6	2.7	2.4
February	4,058.9	1,219	1,030	3.5	2.3	2.4
January	4,071.1	1,400	1,022	3.4	5.8	2.3
2018						
December	4,080.1	1,385	1,015	3.4	5.4	2.2
November	4,078.6	1,305	1,012	3.4	5.4	2.2
October	4,061.8	1,137	1,012	3.5	1.2	2.0
September	4,059.5	1,185	1,011	3.6	1.4	1.9
August	4,056.1	1,317	1,010	3.7	1.5	1.6
July	4,042.4	1,310	1,010	3.7	1.5	1.6
June	4,011.6	1,268	1,012	3.7	1.2	1.5
May	3,975.2	1,138	1,014	3.7	0.8	1.4
April	3,945.9	1,123	1,014	3.9	0.0	1.2
March	3,924.0	1,123	1,012	4.0	-0.2	1.0
February	3,921.3	1,192	1,006	4.1	0.0	0.9
January	3,936.1	1,323	998	4.2	3.8	0.8
2017						
December	3,945.9	1,314	993	4.3	3.8	0.7
November	3,944.2	1,238	991	4.3	3.6	0.6
October	3,926.1	1,123	992	4.2	0.1	0.8
September	3,920.0	1,168	992	4.3	0.4	0.8
August	3,911.4	1,297	993	4.8	1.0	1.0
July	3,898.1	1,290	994	5.3	1.2	1.3
June	3,868.0	1,253	996	5.6	1.1	1.7
May	3,833.0	1,129	999	5.4	1.0	1.7
April	3,798.0	1,123	1,002	5.2	0.9	1.9
March	3,772.9	1,125	1,001	5.0	1.1	2.1
February	3,766.0	1,192	997	4.8	1.8	2.2
January	3,776.6	1,275	991	4.6	2.5	2.1
2016						
December	3,783.9	1,266	987	4.4	2.8	2.0
November	3,782.6	1,195	984	4.3	2.6	1.8
October	3,769.2	1,123	985	4.1	2.3	1.9
September	3,760.1	1,163	985	3.8	1.9	1.8
August	3,733.4	1,285	983	3.2	1.2	1.5
July	3,701.8	1,276	981	2.6	0.8	1.0
June	3,663.6	1,240	980	2.2	0.7	0.5
May	3,636.5	1,118	982	2.2	0.8	0.6
April	3,611.7	1,113	983	2.2	0.6	0.4
March	3,594.3	1,112	981	2.4	0.3	0.2
February	3,594.7	1,170	975	2.3	0.0	0.0
January	3,610.3	1,244	970	2.4	0.0	-0.2

Source: Calculations by Statistics Portugal using the Social Security's Monthly Statement of Earnings (DMR) and the Contibutive Relation of the *Caixa Geral de Aposentações* (CGA).

Table 2a: Number of employees and gross monthly earnings per employee (total and regular) by economic activity (NACE-Rev. 2) in December 2019

Portugal	Quarter ended in the month			Year-on-year change		
	Number of employees	Total gross earnings	Regular gross earnings	Number of employees	Total gross earnings	Regular gross earnings
	Thousands	Euro		%		
Total	**4,205.2**	**1,418**	**1,041**	**3.1**	**2.4**	**2.5**
A - Agriculture, forestry and fishing	86.8	860	670	2.8	4.0	3.5
B - Mining and quarrying	8.9	1,686	1,222	1.5	5.6	6.7
C - Manufacturing	699.1	1,300	941	0.3	2.8	2.8
D - Electricity, gas, steam and air conditioning supply	11.8	3,403	2,497	- 0.7	0.5	0.7
E - Water supply; sewerage, waste management and remediation activities	34.8	1,341	961	4.8	1.7	1.8
F - Construction	278.8	1,027	793	6.6	2.6	2.9
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	666.0	1,246	890	3.3	2.4	2.5
H - Transportation and storage	179.0	1,746	1,231	4.3	1.7	2.6
I - Accommodation and food service activities	311.5	916	690	6.0	3.1	3.0
J - Information and communication	121.2	2,226	1,640	9.7	1.5	1.7
K - Financial and insurance activities	85.5	2,792	2,081	1.7	0.6	1.0
L - Real estate activities	46.1	1,196	906	8.5	2.9	2.9
M - Professional, scientific and technical activities	185.1	1,612	1,209	7.4	2.7	2.4
N - Administrative and support service activities	333.1	913	653	1.5	4.6	4.6
O - Public administration and defence; compulsory social security	368.6	1,877	1,387	1.2	2.4	2.3
P - Education	279.2	2,157	1,627	1.2	2.7	2.9
Q - Human health and social work activities	381.4	1,434	1,028	4.0	2.0	1.8
R - Arts, entertainment and recreation	39.9	1,384	1,052	8.5	2.2	1.8
S - Other service activities	87.1	1,145	868	2.2	2.4	2.2
U - Activities of extraterritorial organisations and bodies	1.2	2,225	1,700	- 0.3	0.1	- 0.9

Source: Calculations by Statistics Portugal using the Social Security's Monthly Statement of Earnings (DMR) and the Contibutive Relation of the *Caixa Geral de Aposentações* (CGA).

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Table 2b: Number of employees and gross monthly earnings per employee (total and regular) by economic activity (NACE-Rev. 2) in 2019

Portugal	Quarter ended in the month			Year-on-year change		
	Number of employees	Total gross earnings	Regular gross earnings	Number of employees	Total gross earnings	Regular gross earnings
	Thousands	Euro		%		
Total	**4,158.3**	**1,276**	**1,038**	**3.5**	**2.7**	**2.6**
A - Agriculture, forestry and fishing	87.5	801	676	5.5	3.5	3.3
B - Mining and quarrying	8.8	1,524	1,203	0.8	6.6	5.1
C - Manufacturing	696.5	1,169	940	1.1	3.0	2.9
D - Electricity, gas, steam and air conditioning supply	11.9	3,032	2,505	1.1	0.3	1.1
E - Water supply; sewerage, waste management and remediation activities	34.2	1,195	961	4.3	2.4	2.1
F - Construction	274.0	947	790	7.6	2.7	2.7
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	655.0	1,131	893	3.2	2.8	2.7
H - Transportation and storage	176.2	1,592	1,232	4.4	4.7	4.8
I - Accommodation and food service activities	308.9	824	687	6.5	3.6	3.3
J - Information and communication	117.1	2,004	1,625	9.8	2.0	1.8
K - Financial and insurance activities	84.7	2,507	2,077	1.8	0.5	0.8
L - Real estate activities	44.9	1,068	898	9.4	2.8	2.6
M - Professional, scientific and technical activities	180.6	1,455	1,207	8.0	2.8	2.4
N - Administrative and support service activities	330.1	839	652	1.5	4.6	4.4
O - Public administration and defence; compulsory social security	366.4	1,649	1,380	1.8	2.2	2.0
P - Education	277.3	1,903	1,614	1.0	2.6	2.7
Q - Human health and social work activities	373.9	1,289	1,031	3.7	3.2	2.2
R - Arts, entertainment and recreation	39.2	1,258	1,036	8.3	1.9	1.5
S - Other service activities	86.3	1,036	869	1.8	2.6	2.4
U - Activities of extraterritorial organisations and bodies	1.2	1,987	1,706	- 1.6	2.2	2.1

Source: Calculations by Statistics Portugal using the Social Security's Monthly Statement of Earnings (DMR) and the Contibutive Relation of the *Caixa Geral de Aposentações* (CGA).

Table 3a: Number of employees and gross monthly earnings per employee (total and regular) by enterprise size in December 2019

Portugal	Quarter ended in the month			Year-on-year change		
	Number of employees	Total gross earnings	Regular gross earnings	Number of employees	Total gross earnings	Regular gross earnings
	Thousands	Euro		%		
Total	**4.205,2**	**1.418**	**1.041**	**3,1**	**2,4**	**2,5**
From 1 to 4 employees	532,6	874	709	1,6	3,9	3,7
From 5 to 9 employees	386,1	1.042	804	2,4	3,4	3,2
From 10 to 19 employees	384,6	1.149	868	3,5	3,1	3,1
From 20 to 49 employees	504,1	1.273	938	3,3	2,9	2,8
From 50 to 99 employees	363,1	1.399	1.015	4,8	2,4	2,1
From 100 to 249 employees	536,5	1.653	1.197	2,6	2,6	2,7
From 250 to 499 employees	345,5	1.776	1.278	1,4	2,2	2,5
500 employees and over	1.152,8	1.739	1.239	4,0	1,2	1,5
SME (up to 249 employees)	2.706,9	1.236	926	2,9	3,1	3,0
LE (250 employees and over)	1.498,3	1.747	1.248	3,4	1,4	1,7

Source: Calculations by Statistics Portugal using the Social Security's Monthly Statement of Earnings (DMR) and the Contibutive Relation of the *Caixa Geral de Aposentações* (CGA).

Note: For simplification of language, we use the designation "enterprise", although, besides the data also includes other entities (foundations, institutes and other organisms, being public, private or from the social sector).

Table 3b: Number of employees and gross monthly earnings per employee (total and regular) by enterprise size in 2019

Portugal	Quarter ended in the month			Year-on-year change		
	Number of employees	Total gross earnings	Regular gross earnings	Number of employees	Total gross earnings	Regular gross earnings
	Thousands	Euro		%		
Total	**4.158,3**	**1.276**	**1.038**	**3,5**	**2,7**	**2,6**
From 1 to 4 employees	531,8	804	706	2,5	3,9	3,8
From 5 to 9 employees	384,1	949	802	3,0	3,5	3,3
From 10 to 19 employees	382,0	1.044	865	4,2	3,0	2,9
From 20 to 49 employees	498,7	1.152	937	3,4	3,2	2,9
From 50 to 99 employees	358,5	1.257	1.012	4,9	2,4	2,1
From 100 to 249 employees	530,3	1.475	1.191	3,1	2,5	2,4
From 250 to 499 employees	345,5	1.578	1.268	4,5	1,6	1,5
500 employees and over	1.127,5	1.562	1.246	3,3	2,5	2,3
SME (up to 249 employees)	2.685,3	1.116	922	3,4	3,1	2,9
LE (250 employees and over)	1.473,0	1.565	1.251	3,6	2,3	2,1

Source: Calculations by Statistics Portugal using the Social Security's Monthly Statement of Earnings (DMR) and the Contibutive Relation of the *Caixa Geral de Aposentações* (CGA).

Note: For simplification of language, we use the designation "enterprise", although, besides the data also includes other entities (foundations, institutes and other organisms, being public, private or from the social sector).

Gross monthly earnings per employee – December 2019

TECHNICAL NOTE

The statistics on "Gross monthly earnings per employee" published with this Press Release are the result of the calculations and analysis performed by Statistics Portugal on the information from the Monthly Statement of Earnings (DMR – *Declaração Mensal de Remunerações*) from Social Security (SS), following a protocol celebrated between Statistics Portugal and the *Instituto de Informática, I.P.*, and the Contributive Relation (RC – *Relação Contributiva*) of *Caixa Geral de Aposentações* (CGA). These statistics are stored in the StatsLab area of the Statistics Portugal website, where new statistical resources that give useful information for economic and social analysis are published.
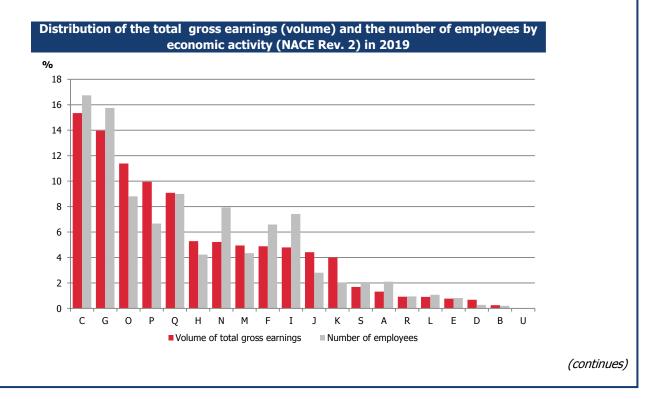
The information received from the DMR includes the sum of earnings reported by enterprises to the SS by "Social Security Contributory Scheme" and "Earnings Components". The information received from the RC includes the sum of earnings of the subscribers of CGA by "Type of earnings". Despite the name differences, both the "Earnings Components" and the "Type of Earnings" refer to the earnings components paid to employees.

The **gross monthly earnings per employee** correspond to the ratio between the sum of the all earnings paid by the enterprises and the total number of employees in those enterprises. Hence, its evolution reflects changes in the amount of earnings paid (for example, the payment of bonuses, holiday allowances or overtime work), but also in the number of employees and its composition, namely in terms of non-observed characteristics in this dataset (part-time versus full-time workers; educational level; occupation; years of experience; hours worked; among others).

In the calculations by **enterprise's economic activity** (NACE-Rev. 2), the records where it was not possible to match the enterprise with its record on the enterprises' economic activity file compiled by Statistics Portugal (FUE – *Ficheiro de Unidades Estatísticas*) were excluded, which corresponds to 0.5% of enterprises and 0.1% of employees in 2018.
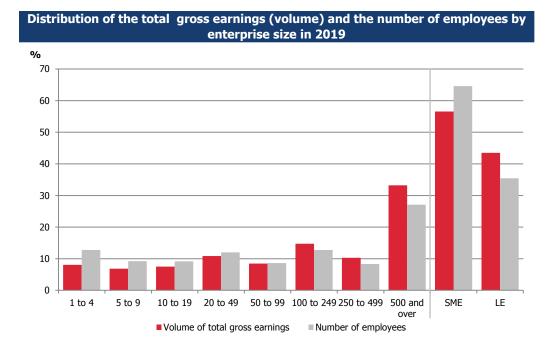
Each employee is counted as many times as the **number of jobs** reported to the Social Security and CGA. For example, an employee with two jobs in two different enterprises is counted twice. Therefore, the total number of employees corresponds to the total number of jobs. Besides, in the information from the SS besides employees, ship-owners, teachers that own educational institutions, members of statutory bodies, and domestic workers are also included.

In the figure below, it is shown the percentage distribution of total gross monthly earnings (volume) and the number of employees by economic activity sector (NACE-Rev. 2) in 2019.

Distribution of the total gross earnings (volume) and the number of employees by economic activity (NACE Rev. 2) in 2019

(continues)

Distribution of the total gross earnings (volume) and the number of employees by enterprise size in 2019

Earnings components (SS): corresponds to the classification of earnings of Social Security according to its nature, which cover the following:

- Transport and daily allowances
- Bonuses and other monthly benefits
- Commissions
- Compensations owed for termination of the employment contract
- Holiday allowance
- Fees for rendering services due to the accumulation of positions/duties
- Compensation in intermittent employment contracts
- Regular monthly allowances
- Christmas allowance
- Bonuses and other non-monthly benefits
- Base salary
- Meal allowance
- Overtime work
- Night-time work
- Regular non-monthly allowances
- Armed forces
- Variable earnings
- Paid untaken holidays
- Earnings statements corrections
- Temporary work in higher positions
- Promotions

Type of earnings (CGA): corresponds to the classification of earnings of *Caixa Geral de Aposentações*, which cover the following:

- Base earnings
- Compensation in intermittent employment contracts
- Seniority payments
- Permanent earnings
- Bonuses and other monthly benefits
- Regular monthly allowances
- Variable earnings
- Transport and daily allowances
- Compensations owed for termination of the employment contract
- Night-time work
- Overtime work
- Meal allowance
- Commissions
- Fees for rendering services due to the accumulation of positions/duties
- Bonuses and other non-monthly benefits
- Holiday allowance
- Paid untaken holidays
- Christmas allowance

Total gross monthly earnings

The total gross monthly earnings correspond to the sum of all gross earnings (before taxes and contributions to the SS or to CGA) paid by enterprises or institutions. It does not include the amounts exempted from tax withheld and contributions to the SS, for example, meal allowances up to €4.77 or €7.63, if paid in cash or meal cards. It includes all components of the variable "Earnings components" of SS and the variable "Type of earnings" of CGA.

Regular gross monthly earnings

The regular gross monthly earnings corresponds to the sum of all gross earnings (before taxes and contributions to the Social Security) paid by enterprises or institutions on a regular and monthly basis. It does not include the amounts exempt from tax withheld and contributions to the SS, for example, meal allowances up to €4.77 or €7.63, if paid in cash or meal cards. It only includes the components "Base salary", "Meal allowance", "Regular monthly allowances" and "Bonuses and other monthly benefits" of the variable "Earnings components" of SS and the components "Base earnings", "Seniority payments"; "Permanent earnings", "Bonuses and other monthly benefits" and ."Meal allowance" of the variable "Type of earnings" of CGA. In 2019, it corresponded to 81.4% of the total gross monthly earnings.

On year rate of change

The on year (year-on-year) change compares the level of the variable in the current quarter/month with that of the corresponding quarter/month of the previous year. This rate of change, considering a seasonal stable pattern, is not affected by this type of fluctuation, but may, however, be influenced by specific effects in a given quarter/month.

Annual rate of change

The annual change compares the level of the variable in the last year over the level of the variable in the previous year.

(continues)

Revisions

The data base of DMR is in continuous updating, always existing some share of non-delivered earnings statements, mainly in the last 4 months. The information received from RC has a definitive character.

The information published with this Press Release that regards the last 3 reference months (moving quarters ended in those months) will be subject to revisions in the next months. These revisions result from the integration of data sent later by some enterprises to the SS. The impact of these revisions, measured by the difference between the estimates now released and the ones published in the Press Release of September of 2019, are the following:

Revision of the estimates of the 3rd quarter of 2019 - major indicators -					
	Unit	July 2019		August 2019	September 2019
Number of enterprises	Thousands		0,3	0,8	2,3
Number of employees	Thousands		-0,1	1,2	12,0
Regular gross monthly earnings per employee	Euros		0	0	-1
Total gross monthly earnings per employee	Euros		1	2	2
Number of enterprises (y-o-y)	pp		0,1	0,2	0,6
Number of employees (y-o-y)	pp		0,0	0,1	0,3
Regular gross monthly earnings per employee (y-o-y)	pp		0,0	0,0	-0,1
Total gross monthly earnings per employee (y-o-y)	pp		0,0	0,2	0,1

Nota: y-o-y - Year-on-year rate of change

Answers' imputation to reduce the revisions level of the values published for the most recent months

In order to reduce the level of revisions of the values published for the most recent months, the DMR data were imputed in two situations: 1) of enterprises that are systematically late in sending the information; and 2) of enterprises that, also systematically, do substantial corrections the values reported in previous months.

In the first case, the detection process for missing enterprises only targets those with 10 or more employees. An enterprise is considered as missing if there was an answer in month m-1, but not in month m (m being the last reference month).

In the second case, it is considered that a company has made a substantial correction of the values already reported when the correction is worth €10,000 or more. The detection of these companies is ensured by a combination of two methods: an *ad hoc* criterion and through the supervised Machine Learning algorithm in the form of the Support Vector Machine (SVM).

A given enterprise meets the *ad hoc* criterion if it meets at least one of two conditions: (i) it has made at least 9 corrections in the past 12 months; or ii) it has made at least 3 corrections in the past 4 months.

The SVM algorithm allows the identification of enterprises that systematically correct information through an optimization process. In this procedure, we use a set of training data (records of enterprises that correct information and of enterprises that do not) to which the SVM algorithm is applied in order to obtain a classification model that maximizes the distinction between the two groups of enterprises, i.e., a model with maximum success rate (accuracy) in identifying enterprises that correct the information submitted previously. Although most enterprises are identified simultaneously by both methods (*ad hoc* and SVM), each allows identifying fringes of enterprises that the other does not. By using both, it is guaranteed that a greater number of enterprises are identified.

Once the enterprises that need imputation of answers are identified, the earnings volume is imputed by enterprise and earnings component. The imputation process is different according to the earnings component. For regular earnings components, such as "Bonuses and other monthly benefits", the "Base salary", the "Meal allowance" and the "Night-time work", the amount reported in the previous month is used. For non-regular components, such as the "Bonuses and other non-monthly benefits", the "Holyday allowance" and the "Christmas allowance", the values of the last year are used multiplied by the year-on-year change of the regular earnings of the previous month. For the remaining earnings components, the median values of the last 12 months are used, provided there are at least 6 observations. Otherwise, the value of the last month is used.

Due to rounding, the totals in tables and figures do not always match the sum of parts.

The present Press Release includes data received on 17 January 2020.

Next Press Release: 7 May 2019.